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PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

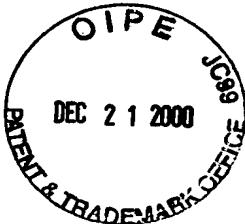
In re the Application of

Yasuhide OHASHI

Application No.: 09/028,456

Filed: February 24, 1998

For: SEMICONDUCTOR DEVICE WITH POWER SOURCE CONDUCTOR
PATTERN AND GROUNDING CONDUCTOR PATTERN (As Amended)



Group Art Unit: 2811

Examiner: L. Thai

Docket No.: JAO 40656

AMENDMENT

Director of the U.S. Patent and Trademark Office
Washington, D. C. 20231

Sir:

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In response to the Office Action dated June 21, 2000, please amend the above-identified application as follows:

IN THE CLAIMS:

Please cancel claims 26-29, 31, 37-39 and 44.

Subt D ✓ Please amend claims 24, 25, 32, 34, 36, 41, 45 and 46 as follows:

24. (Amended) A semiconductor device, comprising:

a semiconductor chip [the semiconductor chip] having a plurality of pads for signal [formed along peripheral edges thereof, the semiconductor chip having] and a plurality of pads for power source and grounding [disposed in a central area thereof], the pads for signal being disposed in areas closer to edges of the semiconductor chip than the pads for power source and grounding; and

~~a flexible substrate having an opening formed therein, the flexible substrate having a power source common lead connected to the pads for power source, the flexible substrate having a grounding common lead connected to the pads for grounding, middle portions of the power source and grounding common leads being continuously positioned inside the opening, and end portions of the power source and grounding common leads being formed on the flexible substrate.~~

C-1
contd.
25. (Amended) A semiconductor device, comprising:

~~a semiconductor chip [, the semiconductor chip] having a plurality of pads;~~

~~and~~

~~a flexible substrate having an opening formed therein, the flexible substrate having a common lead having an electrical connection branch connected to one of the pads, a middle portion of the common lead continuously being positioned inside the opening without connection to the pads, and end portions of the common lead being formed on the flexible substrate.~~

Subt D²
25. (Amended) A semiconductor device, comprising:

~~a semiconductor chip having a plurality of pads; and~~

~~a flexible substrate having an opening formed therein, the flexible substrate having a plurality of leads formed on the flexible substrate and protruding in the opening, the flexible substrate having a common lead, a middle portion of the common lead being continuously positioned inside the opening, and end portions of the common lead being formed on the flexible substrate,~~

~~wherein all of the leads protrude in the opening in a direction different from a direction in which the common lead protrudes in the opening, and~~

~~wherein the leads and the common lead are connected to the pads.~~

Subt D³

34. (Amended) A semiconductor chip, comprising:

a plurality of pads for signal [formed along peripheral edges of the semiconductor chip]; and

a plurality of pads for power source and grounding [disposed in a central area of the semiconductor chip],

wherein the pads for signal are disposed in areas closer to edges of the semiconductor chip than the pads for power source and grounding.

36. (Amended) A semiconductor chip, comprising:

a plurality of pads for signal; and

a [plural] plurality of pads for [or] power source and grounding formed to be bigger than the signal pads.

41. (Amended) A flexible substrate having an opening formed therein, comprising:

a common lead having a stress absorbing portion, a middle portion of the common lead being continuously positioned inside the opening, and both end portions of the common lead being formed on the flexible substrate,

wherein more than one stress absorbing portion is formed in the middle portion of the common lead.

45. (Amended) The flexible substrate according to claim [44] 41, wherein each stress absorbing portion is formed inside the opening and adjacent to an edge of the opening.

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Subt D⁴ 46. (Amended) A flexible substrate having an opening formed therein, comprising:

a plurality of leads formed on the flexible substrate and protruding in the opening; and

a common lead, a middle portion of the common lead being continuously positioned inside the opening, and end portions of the common lead being formed on the flexible substrate,

wherein all of the leads protrude in the opening in a direction different from a direction in which the common lead protrudes in the opening.

REMARKS

Claims 24, 25, 30, 32-36, 40-43 and 45-47 are pending. By this Amendment, claims 26-29, 31, 37-39 and 44 are canceled, and claims 24, 25, 32, 34, 36, 41, 45 and 46 are amended for clarity. No new matter is added.

The Office Action objects to the drawings over minor informalities. This objection is moot in view of the cancellation of claim 27.

The Office Action rejects claims 27 and 36 under 35 U.S.C. §112 over minor informalities. This rejection is moot in view of the cancellation of claim 27 and the amendment of claim 36.

The Office Action rejects claims 25, 27, 32, 33, 37-39, 46 and 47 under 35 U.S.C. §102(b) over Niki (U.S. Patent No. 4,967,261) and Michii (U.S. Patent No. 5,252,853). These rejections are respectively traversed.

Applicant submits that Niki does not disclose a flexible substrate having an opening formed therein, the flexible substrate having a common lead having an electrical connection branch connected to one of the pads, a middle portion of the common lead continuously being positioned inside the opening without connection to the pads, as recited in claim 25. Instead, in Niki, the middle portion of the lead positioned inside an opening is connected to a pad.

As shown in Fig. 2a of Niki, for example, a tape carrier 3 for mounting and bonding an IC chip 1 on a substrate includes an interconnection pattern 2a. The tape carrier 3

comprises a plurality of leads 32 and 33 which have extensions 32a and 33a, respectively, extending horizontally above the IC chip 1 and bonded to an associated bump 1a. However, middle portion of the lead 32 positioned inside an opening is connected to bump 1a. That is, Niki does not disclose or suggest a middle portion of a common lead being continuously positioned inside the opening without connection to the pads, as recited in claim 25.

Accordingly, claim 25 is not anticipated by Niki.

Michii also does not disclose a flexible substrate having an opening formed therein, the flexible substrate having a common lead having an electrical connection branch connected to one of the pads, a middle portion of the common lead being continuously positioned inside the opening without connection to the pads, as recited in claim 25. Instead, in Michii, the middle portion of the lead positioned inside an opening is connected to a pad.

Michii discloses in Fig. 2, for example, a TAB tape 10 comprising a shared ground lead 6 and a shared power lead 7. The shared ground lead 6 has a bus portion which extends along the row of ground pads and is directly connected to all of the ground pads 2. The shared power lead 7 extends along the row of power pads 3 and is directly connected to all of the power pads 3. However, middle portions of the leads 6 and 7 positioned inside an opening is connected to grounding pads 2 and 3, respectively. That is, Michii does not disclose or suggest a middle portion of a common lead being continuously positioned inside the opening without connection to the pads, as recited in claim 25. Accordingly, claim 25 is not anticipated by Michii.

Niki and Michii also do not disclose or suggest that all of the leads protrude in the opening in a direction different from a direction in which the common lead protrudes in the opening, as recited in claim 32 and similarly recited in claim 46. In Niki, some of the leads 32 and 33 protrude into the opening in the same direction. Similarly, in Michii, the

leads 6 and 7 protrude into the opening in the same direction as the leads 8. Accordingly, claims 32 and 46 are not anticipated by Niki and Michii.

Because claim 33 depends from claim 32, and claim 47 depends from claim 46, claims 33 and 47 also are not anticipated by Niki and Michii. Because claims 27 and 37-39 are canceled, the rejection of these claims is moot.

The Office Action rejects claims 24, 34 and 35 under 35 U.S.C. §103(a) over Michii. This rejection is respectively traversed.

Applicant submits that Michii does not disclose or suggest pads for signal being disposed in areas closer to edges of the semiconductor chip than pads for power source and grounding, as recited in claim 24 and similarly recited in claim 34. Instead, as shown in Fig. 1 of Michii, for example, the power pads 2 and 3, for example, are of equal distance from the edges. Accordingly, claims 24 and 34 would not have been obvious over Michii. At least because claim 35 depends from claim 34, claim 35 also would not have been obvious over Michii.

The Office Action rejects claims 26, 28-30 and 36 under 35 U.S.C. §103(a) over Niki and Michii. This rejection is respectively traversed.

Applicant submits that Niki and Michii do not disclose or even suggest that the middle portion of a common lead continuously positioned inside the opening being wider than leads protruding in an opening, as recited in claim 30. In fact, as admitted by the Office Action, neither of Niki nor Michii even suggests middle portions of leads having varying sizes. Similarly, as admitted by the Office Action, neither of Niki nor Michii even suggests a plurality of pads for power source and grounding formed to be bigger than signal pads, as recited in claim 36. Contrary to the Office Action's assertions, these features of claims 30 and 36 would not have been obvious to one having ordinary skill in the art. Accordingly,

claims 30 and 36 would not have been obvious over Niki and Michii. Further, because claims 26, 28 and 29 are canceled, the rejection of these claims are moot.

The Office Action rejects claims 31 and 41-45 under 35 U.S.C. §103(a) over Niki, Michii and Atsushi (JP-08-316270). This rejection is respectively traversed.

Applicant submits that Niki, Michii and Atsushi do not disclose or suggest at least that more than one stress absorbing portion is formed in the middle portion of the common lead, as recited in claim 41. In fact, Niki and Michii are silent as to any stress absorbing portion. Further, as admitted by the Office Action, Atsushi discloses a lead having one bent section 5a. That is, Atsushi fails to disclose or suggest the features of claim 41. Thus, even if combined, Niki, Michii and Atsushi do not disclose or suggest the features of claim 41.

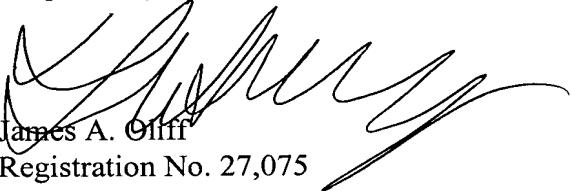
Accordingly, claim 41 and claims 42-45 depending therefrom would not have been obvious over Niki, Michii and Atsushi. Because claim 31 is canceled, the rejection of claim 31 is moot.

For at least the above reasons, claims 25, 27, 32, 33, 37-39, 46 and 47 are not anticipated by Niki and Michii, claims 24, 34 and 35 would not have been obvious over Michii, claims 26, 28, 29, 30 and 36 would not have been obvious over Niki and Michii, and claims 31 and 41-45 would not have been obvious over Niki, Michii and Atsushi. Applicant requests withdrawal of the rejections of claims 25, 27, 32, 33, 37-39, 46 and 47 under 35 U.S.C. §102, and the rejections of claims 24, 26, 28-31, 34-36 and 41-45 under 35 U.S.C. §103.

Applicant submits that application is in condition for allowance. Prompt consideration and allowance are earnestly solicited.

Should the Examiner believe anything further is desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact Applicant's undersigned representative at the telephone number listed below.

Respectfully submitted,


James A. O'Neill
Registration No. 27,075

Thu Anh Dang
Registration No. 41,544

JAO:TAD/gam

Date: December 21, 2000

OLIFF & BERRIDGE, PLC
P.O. Box 19928
Alexandria, Virginia 22320
Telephone: (703) 836-6400

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